

Listing of Claims:

1. (Previously Presented) An image pickup system for processing an image signal at each pixel which comprises a plurality of color signals, and one or more of the color signals are dropped out according to a location of the pixel, the image
5 pickup system comprising:

first interpolation means for interpolating the color signals dropped-out from the image signals by a first interpolation method;

precision verification means for verifying the interpolation
10 precision based on the image signals and the color signals interpolated by the first interpolation means; and

second interpolation means for interpolating the color signals dropped-out from the image signals by a second interpolation method that is different from the first
15 interpolation method in cases where it is judged that the interpolation precision by the first interpolation method is insufficient.

2. (Currently Amended) An image pickup system for processing an image signal at each pixel which comprises a plurality of color signals, and one or more of the color signals

are dropped out according to a location of the pixel, the image
5 pickup system comprising:

separation means for separating the image signals into first
image signals and second image signals based on predetermined
characteristics relating to the image signals;

10 first interpolation means for interpolating the dropped-out
color signals from the first image signals by a first
interpolation method;

second interpolation means for interpolating the dropped-out
color signals from the second image signals by a second
interpolation method that is different from the first
15 interpolation ~~means~~ method;

precision verification means for verifying the interpolation
precision based on the first image signals and the color signals
interpolated by the first interpolation means for ~~the~~ regions of
the first image signals, and verifying the interpolation
20 precision based on the second image signals and the color signals
interpolated by the second interpolation means for ~~the~~ regions of
the second image signals; and

adjustment means for causing interpolation processing of the
dropped-out color signals to be performed again ~~from the image~~
25 ~~signals~~ by the second interpolation means when insufficient
interpolation was performed by the first interpolation means, and
for causing interpolation processing of the dropped-out color

signals to be performed again ~~from the image signals~~ by the first interpolation means when insufficient interpolation was performed
30 by the second interpolation means, in cases where it is judged that the interpolation precision is insufficient.

3. (Previously Presented) An image pickup system for processing an image signal at each pixel which comprises a plurality of color signals, and one or more of the color signals are dropped out according to a location of the pixel, the image
5 pickup system comprising:

first interpolation means for interpolating the color signals dropped-out from the image signals by a first interpolation method;

second interpolation means for interpolating the color
10 signals dropped-out from the image signals by a second interpolation method that is different from the first interpolation method;

precision verification means for verifying the interpolation precision based on the image signals, the color signals
15 interpolated by the first interpolation means and the color signals interpolated by the second interpolation means; and

selection means for selecting color signals having a higher interpolation precision between the color signals interpolated by

the first interpolation means and the color signals interpolated
20 by the second interpolation means.

4. (Previously Presented) The image pickup system according
to claim 1, wherein the first interpolation means or second
interpolation means comprises:

5 extraction means for extracting regions of a predetermined
size centered on pixels of interest from the image signals,
edge extraction means for extracting a plurality of edge
intensities relating to predetermined directions from the pixels
of interest within the extracted regions,

10 weighting calculation means for calculating weighting
coefficients that are normalized from the extracted edge
intensities,

15 interpolation signal calculation means for calculating a
plurality of interpolation signals relating to predetermined
directions from the pixels of interest within the extracted
regions, and

20 calculation means for calculating the dropped-out color
signals in the pixels of interest based on a plurality of
weighting coefficients relating to the predetermined directions
and a plurality of interpolation signals relating to the
predetermined directions.

5. (Previously Presented) The image pickup system according to claim 1, wherein the first interpolation means or second interpolation means comprises:

5 extraction means for extracting regions of a predetermined size centered on pixels of interest from the image signals, and calculation means for calculating the dropped-out color signals in the pixels of interest within the extracted regions by linear interpolation or cubic interpolation.

6. (Previously Presented) The image pickup system according to claim 1, wherein the first interpolation means or second interpolation means comprises:

5 extraction means for extracting regions of a predetermined size centered on pixels of interest from the image signals,

correlation calculation means for determining the correlation between the respective color signals within the extracted regions as a linear equation, and

10 calculation means for calculating the dropped-out color signals based on the image signals and the correlation.

7. (Previously Presented) The image pickup system according to claim 1, wherein the precision verification means comprises:

correlation calculation means for determining correlation information relating to the correlations between the respective

5 color signals for each predetermined region based on the image signals and the color signals interpolated by the first interpolation means, and
correlation verification means for verifying the interpolation precision based on the correlation information.

8. (Previously Presented) The image pickup system according to claim 1, wherein the precision verification means comprises:
hue calculation means for determining hue information for each pixel based on the image signals and the color signals
5 interpolated by the first interpolation means, and
hue verification means for verifying the interpolation precision based on the hue information.

9. (Previously Presented) The image pickup system according to claim 1, wherein the precision verification means comprises:
edge calculation means for determining edge information for each predetermined region based on the image signals and the
5 color signals interpolated by the first interpolation means, and
edge verification means for verifying the interpolation precision based on the edge information.

10. (Previously Presented) The image pickup system according to claim 2, wherein the separation means comprises:

edge calculation means for determining edge information for each predetermined region from the image signals, and

5 image signal separation means for separating the image signals based on the edge information.

11. (Previously Presented) The image pickup system according to claim 2, wherein the separation means comprises:

correlation calculation means for determining correlation information relating to the correlations between the respective
5 color signals for each predetermined region from the image signals, and

image signal separation means for separating the image signals based on the correlation information.

12. (Previously Presented) The image pickup system according to claim 1, further comprising control means for controlling the precision verification means and the second interpolation means such that the operation of the precision verification means and the operation of the second interpolation means can be stopped.

13. (Previously Presented) The image pickup system according to claim 2, further comprising control means for controlling the precision verification means and the second

interpolation means such that the operation of the precision verification means and the operation of the adjustment means can be stopped.

14. (Previously Presented) The image pickup system according to claim 3, further comprising control means for controlling the precision verification means and the second interpolation means such that the operation of the second interpolation means and the operation of the precision verification means can be stopped, and for controlling the selection means such that when the operation of the second interpolation means and the operation of the precision verification means are stopped, the selection means is caused to select only the color signals that are interpolated by the first interpolation means.

15. (Previously Presented) The image pickup system according to claim 12, wherein the control means comprises:

information acquisition means for acquiring at least one type of information selected from a set comprising image quality information relating to the image quality of the image signals, image pickup mode information set in the image pickup system, and interpolation processing switching information that can be manually set, and

judgment means for judging whether or not the operations are
to be stopped based on at least one type of information selected
from a set comprising the image quality information, image pickup
mode information, and interpolation processing switching
information.

16. (Currently Amended) A ~~computer-readable recording~~
~~medium having stored thereon an image processing program~~ method,
for an image pickup system, for processing ~~, by means of a~~
~~computer,~~ an image signal at each pixel which comprises a
plurality of color signals, wherein the image pickup system
comprises an image pickup element which outputs an image signal
for each pixel from which and one or more of the color signals
are dropped out according to the location of the pixel, the ~~image~~
~~processing program causing the computer to function as~~ method
comprising:

~~first interpolation means for interpolating, by a first~~
~~interpolating unit of the image pickup system,~~ the color signals
dropped-out from the image signals by a first interpolation
method;

~~precision verification means for verifying, by a~~
~~verification unit of the image pickup system,~~ the interpolation
precision based on the image signals and the color signals

interpolated by the first ~~interpolation means~~ interpolating unit;
and

20 ~~second interpolation means for~~ interpolating, by a second
interpolating unit of the image pickup system, the color signals
dropped-out from the image signals by a second interpolation
method that is different from the first interpolation method in
cases where it is judged that the interpolation precision is
25 insufficient.

17. (Currently Amended) A ~~computer-readable recording~~
~~medium having stored thereon an image processing program~~ method,
for an image pickup system, for processing ~~, by means of a~~
~~computer~~, an image signal at each pixel which comprises a
5 plurality of color signals, wherein the image pickup system
comprises an image pickup element which outputs an image signal
for each pixel from which ~~and~~ one or more of the color signals
are dropped out according to the location of the pixel, the ~~image~~
~~processing program causing the computer to function as~~ method
10 comprising:

~~separation means for~~ separating, by a separating unit of the
image pickup system, the image signals into first image signals
and second image signals based on predetermined characteristics
relating to the image signals;

15 ~~first interpolation means for~~ interpolating, by a first
interpolating unit of the image pickup system, the color signals
dropped-out from the first image signals by a first interpolation
method;

20 ~~second interpolation means for~~ interpolating, by a second
interpolating unit of the image pickup system, the color signals
dropped-out from the second image signals by a second
interpolation method that is different from the first
interpolation ~~means~~ method;

25 ~~precision verification means for~~ verifying, by a
verification unit of the image pickup system, the interpolation
precision based on the first image signals and the color signals
interpolated by the first ~~interpolation means~~ interpolating unit
for ~~the~~ regions of the first image signals, and ~~for~~ verifying, by
the verification unit, the interpolation precision based on the
30 second image signals and the color signals interpolated by the
second ~~interpolation means~~ interpolating unit for ~~the~~ regions of
the second image signals; and

35 ~~adjustment means for~~ causing, by an adjustment unit of the
image pickup system, interpolation processing of the dropped-out
color signals to be performed again from the image signals by the
second ~~interpolation means~~ interpolating unit when insufficient
interpolation was performed by the first ~~interpolation means~~
interpolating unit, and ~~for~~ causing, by the adjustment unit,

interpolation processing of the dropped-out color signals to be
40 performed again ~~from the image signals~~ by the first interpolation
~~means~~ interpolating unit when insufficient interpolation was
performed by the second ~~interpolation means~~ interpolating unit,
in cases where it is judged that the interpolation precision is
insufficient.

18. (Currently Amended) A ~~computer-readable recording~~
~~medium having stored thereon an image processing program~~ method,
for an image pickup system, for processing, ~~by means of a~~
~~computer,~~ an image signal at each pixel which comprises a
5 plurality of color signals, wherein the image pickup system
comprises an image pickup element which outputs an image signal
for each pixel from which ~~and~~ one or more of the color signals
are dropped out according to the location of the pixel, the ~~image~~
~~processing program causing the computer to function as~~ method
10 comprising:

~~first interpolation means for~~ interpolating, by a first
interpolating unit of the image pickup system, the color signals
dropped-out from the image signals by a first interpolation
method;

15 ~~second interpolating means for~~ interpolating, by a second
interpolating unit of the image pickup system, the color signals

dropped-out from the image signals by a second interpolation method that is different from the first interpolation method;

20 ~~precision verification means for verifying, by a~~
~~verification unit of the image pickup system,~~ the interpolation
precision based on the color signals, the color signals being
interpolated by the first ~~interpolation means~~ interpolating unit
and by the second ~~interpolation means~~ interpolating unit; and
25 ~~selection means for selecting, by a selection unit of the~~
~~image pickup system,~~ color signals that have a higher
interpolation precision between the color signals that are
interpolated by the first ~~interpolation means~~ interpolating unit
and the color signals that are interpolated by the second
~~interpolation means~~ interpolating unit.

19. (Previously Presented) The image pickup system according to claim 2, wherein the first interpolation means or second interpolation means comprises:

5 extraction means for extracting regions of a predetermined size centered on pixels of interest from the image signals;

edge extraction means for extracting a plurality of edge intensities relating to predetermined directions from the pixels of interest within the extracted regions;

weighting calculation means for calculating weighting
10 coefficients that are normalized from the extracted edge
intensities;

interpolation signal calculation means for calculating a
plurality of interpolation signals relating to predetermined
directions from the pixels of interest within the extracted
15 regions; and

calculation means for calculating the dropped-out color
signals in the pixels of interest based on a plurality of
weighting coefficients relating to the predetermined directions
and a plurality of interpolation signals relating to the
20 predetermined directions.

20. (Previously Presented) The image pickup system
according to claim 2, wherein the first interpolation means or
second interpolation means comprises:

extraction means for extracting regions of a predetermined
5 size centered on pixels of interest from the image signals; and

calculation means for calculating the dropped-out color
signals in the pixels of interest within the extracted regions by
linear interpolation or cubic interpolation.

21. (Previously Presented) The image pickup system according to claim 2, wherein the first interpolation means or second interpolation means comprises:

extraction means for extracting regions of a predetermined
5 size centered on pixels of interest from the image signals;

correlation calculation means for determining the correlation between the respective color signals within the extracting regions as a linear equation; and

calculation means for calculating the dropped-out color
10 signals based on the image signals and the correlation.

22. (Previously Presented) The image pickup system according to claim 2, wherein the precision verification means comprises:

correlation calculation means for determining correlation
5 information relating to the correlations between the respective color signals for each predetermined region based on the image signals and the color signals interpolated by the first interpolation means, and

correlation verification means for verifying the
10 interpolation precision based on the correlation information.

23. (Previously Presented) The image pickup system according to claim 2, wherein the precision verification means comprises:

hue calculation means for determining hue information for
5 each pixel based on the image signals and the color signals interpolated by the first interpolation means, and

hue verification means for verifying the interpolation precision based on the hue information.

24. (Previously Presented) The image pickup system according to claim 2, wherein the precision verification means comprises:

edge calculation means for determining edge information for
5 each predetermined region based on the image signals and the color signals interpolated by the first interpolation means, and

edge verification means for verifying the interpolation precision based on the edge information.

25. (Previously Presented) The image pickup system according to claim 3, wherein the first interpolation means or second interpolation means comprises:

extraction means for extracting regions of a predetermined
5 size centered on pixels of interest from the image signals;

edge extraction means for extracting a plurality of edge intensities relating to predetermined directions from the pixels of interest within the extracted regions;

10 weighting calculation means for calculating weighting coefficients that are normalized from the extracted edge intensities;

15 interpolation signal calculation means for calculating a plurality of interpolation signals relating to predetermined directions from the pixels of interest within the extracted regions; and

20 calculation means for calculating the dropped-out color signals in the pixels of interest based on a plurality of weighting coefficients relating to the predetermined directions and a plurality of interpolation signals relating to the predetermined directions.

26. (Previously Presented) The image pickup system according to claim 3, wherein the first interpolation means or second interpolation means comprises:

5 extraction means for extracting regions of a predetermined size centered on pixels of interest from the image signals; and

calculation means for calculating the dropped-out color signals in the pixels of interest within the extracted regions by linear interpolation or cubic interpolation.

27. (Previously Presented) The image pickup system according to claim 3, wherein the first interpolation means or second interpolation means comprises:

extraction means for extracting regions of a predetermined
5 size centered on pixels of interest from the image signals;

correlation calculation means for determining the correlation between the respective color signals within the extracting regions as a linear equation; and

calculation means for calculating the dropped-out color signals based on the image signals and the correlation.

28. (Previously Presented) The image pickup system according to claim 3, wherein the precision verification means comprises:

correlation calculation means for determining correlation
5 information relating to the correlations between the respective color signals for each predetermined region based on the image signals and the color signals interpolated by the first interpolation means, and

correlation verification means for verifying the
10 interpolation precision based on the correlation information.

29. (Previously Presented) The image pickup system according to claim 3, wherein the precision verification means comprises:

hue calculation means for determining hue information for each pixel based on the image signals and the color signals interpolated by the first interpolation means, and

hue verification means for verifying the interpolation precision based on the hue information.

30. (Previously Presented) The image pickup system according to claim 3, wherein the precision verification means comprises:

edge calculation means for determining edge information for each predetermined region based on the image signals and the color signals interpolated by the first interpolation means, and

edge verification means for verifying the interpolation precision based on the edge information.

31. (Previously Presented) The image pickup system according to claim 13, wherein the control means comprises:

information acquisition means for acquiring at least one type of information selected from a set comprising image quality information relating to the image quality of the image signals, image pickup mode information set in the image pickup system, and

interpolation processing switching information that can be manually set, and

10 judgment means for judging whether or not the operations are to be stopped based on at least one type of information selected from a set comprising the image quality information, image pickup mode information, and interpolation processing switching information.

32. (Previously Presented) The image pickup system according to claim 14, wherein the control means comprises:

information acquisition means for acquiring at least one type of information selected from a set comprising image quality
5 information relating to the image quality of the image signals, image pickup mode information set in the image pickup system, and interpolation processing switching information that can be manually set, and

10 judgment means for judging whether or not the operations are to be stopped based on at least one type of information selected from a set comprising the image quality information, image pickup mode information, and interpolation processing switching information.